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FISHES OF THE SALTON SEA.

Recently (May 7-14) I visited Salton Sea in southern California and, incidentally, obtained some information regarding the fishes of that interesting body of water.

As is well known, the Salton Sea was formed in 1905-6 by the breaking of a dike which permitted the water of the Colorado River to rush through into the Salton Sink, a vast area below sea-level. Although the break was finally gotten under control, and the lake began to dry up, it has, nevertheless, remained an enormous expanse of water. The depth varies considerably within the year, being greatest in the winter and least in the fall. The average depth for any one year is always somewhat less than that of the previous year. Considerable fresh water finds its way into the lake each year by seepage from the irrigation operations in Imperial Valley, so that the water is kept fresher than it otherwise would be.

When the water was flowing in through the break in the dike, some fishes were carried with it. At one time they were said to be very abundant. Just how abundant they were can not now be determined, nor do we know all the species represented. At the present time the following species are known to be in the lake:

1. Carp, *Cyprinus carpio.* This is undoubtedly the most abundant species. It probably escaped into the Colorado River from private fish ponds in Arizona. I saw several specimens, all of good size (3 to 10 pounds) at Cormorant Island.

2. Bony-tail, *Gila elegans.* Said to be not uncommon; I saw no specimens.

3. Humpback Sucker, *Xyrauchen cypho.* Rather common; I saw several specimens. They all had a starved appearance.

4. Colorado River Trout, *Salmo pleuriticus.* Although the water of the Salton Sea is quite brackish, strongly alkaline, and very warm, this trout seems to thrive in it amazingly well. It is said to be fairly common. I saw one fine example about 16 inches long. It was in excellent condition, albeit somewhat bleached in color.

5. Common mullet, *Mugil cephalus.* Next to the Carp, the most common species. Numerous examples were seen. It is said to reach a large size (as much as 6 pounds) and to be unusually fine as a food-fish.

6. Desert Cyprinodont, *Cyprinodon macularius.* This interesting little fish was found in Figtree John spring in a small oasis near the north end of the lake some 7 miles southwest of Mecca. This spring or water hole was grown up thickly with cattails (*Typha latifolia*) and the surface of the water was covered with a thick coating of algæ of various species. The water was only a few inches deep and quite warm, perhaps as warm as 90° to 100° on hot days. The fish, however, were active and apparently in good condition. I caught a number of them and succeeded in bringing two alive to San Francisco. One of them died a few days ago, the other is still alive and doing well.

This cyprinodont appears to be found in many of the isolated springs and water-holes in the deserts

of southern California. Only this week (June 1) Mr. Samuel Hubbard of Oakland, brought me 14 fine specimens of this species from Saratoga Springs, Death Valley, where Mr. Hubbard says they are very abundant.

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A COMPARISON OF ATLANTIC AND PACIFIC SPECIMENS OF THE HAMMER-HEAD SHARK, *SPHYRNA ZYGAENA.*

In their review of the elasmobranchs of Japan, Jordan and Fowler (Proc. U. S. Natl. Mus., XXVI, 593, 1903) raise the question whether the hammer-head of the Pacific usually referred to *Sphyrna zygaena* is really identical with that species from the Atlantic. They say that specimens from the two regions need comparison.

I have recently made a detailed comparison of hammer-heads from the Atlantic and Pacific and found them absolutely similar, and this note is intended to record this fact.

The specimens examined were, one from Woods Hole, Mass., 60.5 cm. in length, and two from Japan respectively 51 and 56 cm. The three were found entirely similar in all characters that could be considered specifically diagnostic—such as, body proportions, shape and position of the fins, form and relative size of the "hammer," and the size and position of the eye, mouth and gill area. The coloration only was a little different, the Woods Hole specimen being dark brown above while the Japanese ones were blackish gray. This, however, is not important since differences in coloration are not rare in fishes from widely separated localities, and besides, it may have been due to different preserving fluids having been used in the two cases.

It is worth noting, by the way, that the three specimens showed nicely three successive stages in the growth of the teeth in the hammer-head. In the 51 cm. shark no teeth had yet appeared in either jaw. In the 56 cm. one, minute teeth could be felt by the finger in the lower jaw, but none could be detected in the upper. In the 60.5 cm. specimen, teeth were well developed in both jaws and were from 1.5 mm. to 3 mm. in height. Since none of the three specimens was embryonic, but all were free-swimming young sharks, it follows that *Sphyrna zygaena* is born toothless and that teeth make their appearance when the shark is about 55 cm. in length. The teeth then grow rapidly, reaching a length of 1.5 to 3 mm. in height by the time the shark is 60 cm. in length.

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NOTES ON SOME FISHES FROM CHILI.

Through the kindness of Dr. W. P. Wilson, I have been enabled to examine some market-fishes received from Valparaiso by the Commercial Museum of Philadelphia. Among them I found:

Catulus chilensis (Guichenot), *Squalus acanthias,* Linn., *Raja lima,* Peoppig, *R. flavirostris,* Philippi, *Callorynchus callorynchus* (Linn.), *Carassius auratus* (Linn.), *Ophichthus ocellatus* (Le Sueur), *Clupanodon sagax* (Jenyns), *Ethmidium coerulea* (Valenciennes), *Mugil cephalus,* Linn., *Sarda chilensis* (Valenciennes), *Thyrsites atun* (Euphrasen), *Seriolella violacea,* Guichenot, *Trachurus picturatus* (Bowdish), *Percichthys trucha* (Valenciennes), *Paralabrax humeralis* (Valenciennes), *Isacia conceptionis* (Valenciennes), *Sciaena fasciata* (Tschudi), *Aplodactylus punctatus,* Valenciennes, *Chromis crusma* (Valenciennes), *Sebastodes darwini* (Cramer), *S. chilensis,* Steindachner, *Pinguipes chilensis* (Molina), *Prolatilus jugularis* (Val-

enciennes), *Porichthys porosus* (Valenciennes), *Gobiesox marmoratus*, Jenyns, *Scartichthys eques* (Steindachner), *Genypterus blacodes* (Schneider), *Eleginops maclovina* (Valenciennes), *Bovichthus diacanthus* (Carmichael), *Paralichthys kingii* (Jenyns).

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A LARGE POLYODON FROM IOWA.

The American Museum of Natural History has received the photograph of a very large, mounted Polyodon, taken in Lake Okoboji, Northern Iowa, February 22, 1916, by Mr. R. D. Vanderbeck of Arnold's Park, Iowa, who writes that it was taken with a spear and gives the length of the fish as 7 ft. 1 in., its girth 45½ in., the length of the bill 17 in.

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NOTES ON CISTUDO CAROLINA FROM ORIENT, LONG ISLAND.

Considerable has been said in COPEIA about the aquatic habits of the Box Tortoise on Long Island. I would like to put on record a few instances of its frequenting both fresh and salt water near Orient.

One quite remarkable occurrence was in August, 1909, at East Marion. In the center of a dry woods there was a depression where the water had recently evaporated, leaving a deep oozy mire. In and around this sink I counted between sixty and seventy of these turtles. More than half of these were partly or entirely submerged in the mud. Specimens were poked out that were buried near a foot in depth. Circling around the hole at varying distances I observed numbers of others working toward it from all directions. The most surprising thing to me was

the speed that the more distant ones were traveling. It may not be an uncommon fact that the Box Tortoise hurry, but was new to me, for these outsiders were moving on at the gait of a fast walk. This was a gathering of tortoises that I have never witnessed before or since.

Cistudo also frequently enters salt water near Orient. Lying between a sandy cedar-grown beach and the mainland of Orient is a bay one mile wide. I have on several occasions found these turtles midway across, always swimming leisurely toward the mainland. It seems evident that they enter the water of their own free will, as the beach to the south is flat and no creeks running out.

While off on the fishing ledges on the sound I have on two occasions seen this species more than half a mile from land. Although both these specimens were swimming toward the Orient hills to the south, they were being carried rapidly east or west with the strongly flowing tide. It is a question where these specimens came from, whether from the nearest inlet fifteen miles west, or the New England rivers. It is improbable that they entered the water near Orient.

The record flood tide of December, 1909, washed over a portion of the beach south of the bay that had not been inundated in about fifty years. Taking observation there a few days after the water had receded—which overflowed for one tide only—I found four of these turtles that had left their hibernation burrows and frozen to death. The flood ebbed off in the afternoon and that night it became severely cold. The salt water coming in from the ocean at that time, early in the winter, was warm. In every case the animal was not over four feet from the burrow. I was interested to notice that the holes were only deep enough to slightly cover the shell with sand.

Whether this species' preference for eating a certain mushroom is well known I am not aware. In this section the ***Russula obscura*** is devoured almost

exclusively. When collecting fleshy fungi I have wondered at the wisdom of a turtle to pass *Amanita, Amanitopsis, Lactarius* and *Boletus* forms, while only the stipe of practically every *Russula obscura* along the lane is left and the ground strewed with crumbs.

It was a common practice in former days to carve initials on the plastron of these tortoises. Among the long list of names in the writer's possession is one dated 1838.

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NOTES ON NEW JERSEY BATRACHIANS AND REPTILES.

Spelerpes longicauda. Common along brooks and about springs in the Watchung Hills near Plainfield.

Bufo americanus. The common toad of the vicinity of Plainfield and, so far as known, of the whole southern two-thirds of New Jersey is *Bufo fowleri.* I have found *B. americanus* at Budd's Lake, Newfoundland, and Newton and recently at Mine Brook, about one mile west of Bernardsville, Somerset Co. The latter locality is a quarter mile north of Lat. 40° 42′ and lies in a narrow valley of 200 feet elevation between hills which on the south rise to a height of 530 feet and immediately north to 680 feet, two miles further north reaching 857 feet.

The long parallel trap ridges a few miles to the south attain a height of 600 feet, but I have never found the American Toad in those hills. The Mine Brook locality is the southernmost known station for this species in the state. In the more northern New Jersey stations, where the altitude is greater, it is associated with a distinctly more northern flora and fauna than that of Mine Brook.

I first discovered *B. americanus* at this locality on April 11, 1915. On that date there were fully a 100 of the toads singing and breeding in a small pond by the main road near the corner of the Mount Harmony Road. A number of specimens were secured, all characterized by the large warts, thick, fleshy hind feet, and bright yellowish or reddish tints of this species, while in many individuals the underparts were spotted with black. In the same pond were Pickerel Frogs and Spring Peepers (*Hyla*). Eggs of the toad taken home hatched in six days or a little less.

Hyla andersoni. About eight years ago James Chapin and I found this beautiful Tree Frog at the Runyon Pond two miles south of Sayreville, Middlesex Co. Since that time I have found it at several other localities in the same region—one mile south of Old Bridge, about one mile southeast of Browntown and at Freneau near Matawan. These localities are all in the sandy pine barren "island" north of the Pine Barrens proper. Thus this species extends northward to within three miles or less of the lower Raritan River, its range coinciding at this point with that of the Carolina Chickadee.

Virginia valeriae. Some years ago I came across several individuals of this small snake on the trap ridges immediately north of Plainfield. With one exception, they were on the north side of the First Mountain at Watchung, a single individual being found on the Second Mountain less than a mile further north. All were hiding under boards or stones in dry deciduous woods. The single specimen preserved was collected on May 30, 1903.

This species has not, so far as I am aware, been found elsewhere in New Jersey, and the above locality is its northernmost known station.

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